THE EFFECTS OF INTERACTIVE ENGAGEMENT ON MOTIVATION, PARTICIPATION AND CONCEPTUAL UNDERSTANDING IN HIGH SCHOOL PHYSICS

by

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STATEMENT OF PERMISSION TO USE

In presenting this professional paper in partial fulfillment of the requirements for a master’s degree at Montana State University, I agree that the MSSE Program shall make it available to borrowers under rules of the program.

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ABSTRACT

The purpose of this study was to determine if there was a correlation between student motivation and participation in the understanding of physics concepts. Participation of students did increase with the introduction of interactive engagement. Cooperative group work (one type of interactive engagement) did not show any higher increase in learning of the material as compared with lecture format, although students reported experiencing more motivation during interactive engagement

INTRODUCTION AND BACKGROUND

I teach at the Lehigh Valley Charter High School for the Performing Arts (LVPA) in Bethlehem, Pennsylvania. Our current student body is 436 students for the 2010 – 2011 school year (http://lvpa.org). Our school culture is mainly the "alternative" culture of other schools. Students are attracted to LVPA because they want to do something different than the usual round of academics and/or sports. These students are passionate about one of six artistic areas: visual art, instrumental music, vocal music, theatre, dance, or figure skating. In order to be accepted into the school, they must audition in one of the six artistic areas. These auditions show that students exhibit motivation and a willingness to extend themselves beyond their comfort zone.

Our school operates on a modified block schedule. Classes are every other day for 58 minutes. I felt that I should modify the presentation of the material to encourage student understanding since they are not in class every day. I hoped that experiencing more motivation would allow the understanding of concepts to be transferred from one class period to the next - two days later.

I wanted to increase motivation, participation, and conceptual understanding in three sections of physics through interactive engagement (active learning). Active learning allows students to actively participate during class instead of listen passively to lecture. I hoped that given the opportunity for interactive engagement, students' motivation for and understanding of the concept(s) increased. This concern about my students' level of understanding and motivation during physics class led me to my focus question: What are the effects of interactive engagement on students' conceptual understanding and motivation? Specifically, I wanted to look at how peer instruction and group work impacted conceptual understanding, and how these types of engagement impacted motivation, student attitude, and student participation.

CONCEPTUAL BACKGROUND

Hake (1998) states that a traditional high school lecture consists of students sitting in front of a teacher passively listening as the teacher works through notes, does demonstrations, and gives lectures. Cahyadi (2004) says that students need to form a knowledge base and not be told, or lectured to, because they will not retain information. Lack of student engagement in a lecture may not be due to lack of motivation, but from student passivity during traditional instruction (Johnson, 2008).

Commonly, when students are tested in class, they are proficient in using equations and in problem-solving ability, but they lack the conceptual understanding which those equations and problems are based on (Kim & Pak, 2002; Tao, 2001). Kim and Pak (2002) showed that completing many problems does not correlate with conceptual understanding. Rote learning of problem-solving may produce the correct answer, but further questioning of the student shows that they are not able to answer the reason why a particular equation was used. Often, students end up memorizing information and not understanding the material (Mazur, 1997; Hake, 1998).

As Cortright, Collins, and DiCarlo (2005) show, conceptual understanding is meaningful learning and it is active learning. Mant, Wilson, and Coates (2007) showed that interactive engagement and cognitive challenge produced higher achievement. During interactive engagement, students are forced to think and respond, obliged to discuss their ideas with their peers, and required to commit to an answer; in other words, active learning is occurring (Meltzer & Manivannan, 2002). Interactive engagement includes immediate feedback from either peers or the teacher during discussions (Hake, 1998).

Engagement by students can be shown in different ways. Flash-cards (Cortright et al., 2005; Meltzer & Manivannan, 2002) allow for all students to be engaged at the same time when posed a question by the teacher. Dykstra, Boyle, and Monarch (1992) describe discussion groups as “town meetings” where all ideas can be shared. Even when students in the group do not initially know the answer, they benefit by increasing their conceptual understanding through peer discussion and coming to a consensus after looking at all possible answers and all students having a say (Smith et al., 2009).

Peer instruction is listed as another method of interactive engagement (Turpen & Finkelstein, 2009; Dykstra et al., 1992; Tao, 2001; Cortright et al., 2005; Smith et al., 2009; Meltzer & Manivannan, 2002; Mazur, 1997). Mazur (1997) utilized peer instruction after realizing that students did not have conceptual understanding of the physics principles being taught. Peer instruction allows for immediate feedback and has all students involved and engaged in the material. While talking with their groups, students are continually thinking about the subject matter. This group interaction facilitates metacognition and conceptual understanding (Smith et al., 2009). Smith et al. (2009) have said that peer instruction can "provide valuable opportunities for students to develop the communicative and metacognitive skills that are crucial components of disciplinary expertise" (p. 124). Meltzer and Manivannan (2002) like to take every opportunity to interrupt the series of multiple choice questions with simple drawing activities, free-response exercises, or some kind of group activity. Smith et al. have shown that after peer instruction of a question, or series of questions, students will respond correctly when individually answering a similar question.

Dykstra et al. (1992) have shown that conceptual understanding occurs when new knowledge is constructed; that the point of instruction should be to bring about this conceptual change. Dykstra et al. (1992) also point out that student ownership needs to occur before conceptual change will occur. Conceptual change for students begins when they are thinking through the question on their own and forming connections, and then discussing answers with others; they are more able to accept explanation at this point either from the instructor, or from another student (Meltzer & Manivannan, 2002). This group discussion about a conceptual question encourages students to move beyond reflection of their ideas into higher order thinking skills, such as evaluation (Yuruk, Beeth, & Andersen, 2009). This active learning allows students to continuously probe their own understanding (Meltzer & Manivannan, 2002) and promotes metacognition, or awareness of one’s thinking processes. When any student engages in metacognition, their achievement will increase (Garcia & Pintrich, 1995).

The motivation of students has an impact upon their achievement. Higher motivation leads to better cognitive engagement (Garcia & Pintrich, 1995). Mant et al. (2007) state that students show increased motivation when they are allowed to share their thoughts, either within groups or within the class. Garcia and Pintrich (1995) have shown that students who report higher levels of motivation have better grades than those students who are not motivated.

Meltzer and Manivannan (2002) warn that teachers who use interactive engagement may not cover the same amount of material, but students' conceptual understanding of the material covered is much higher than students who had traditional instruction. They also stress that students may rebel or resist at first to implementation of interactive engagement because they are used to traditional methods. Cahyadi (2004) makes note that since active learning does not focus on quantitative problem-solving during class, and if quantitative problems are to show up on a summative test, then the instructor must do problems on the side, and not completely exclude them.

The benefits of implementing interactive engagement are positive attitudes, increased motivation, improved confidence, and engagement (Cortright et al., 2005; Cahyadi, 2004). Falconer, Wyckoff, Joshua, and Sawada (2001) reported increased conceptual understanding after active learning. Interactive engagement produced conceptual understanding which led to better quantitative problem-solving ability (Tao, 1999; Meltzer & Manivannan, 2002). Yuruk et al. (2009) reported that students who achieve conceptual understanding after active learning maintain that knowledge for a longer period of time than those students who just memorize.

METHODOLOGY

Treatment

My focus question looked at the effects of interactive engagement on students' conceptual understanding and motivation. Specifically, I wondered how interactive engagement would impact motivation and participation; and how peer instruction and cooperative group work would impact conceptual understanding and motivation. The research methodology for this project received an exemption by Montana State University's Institutional Review Board and compliance for working with human subjects was maintained. The treatment for this study consisted of three parts. Each part focused on a different topic in physics. The linear and projectile motion unit utilized lecture format with students doing worksheets and in-class homework by themselves; this unit was used as a comparison for two types of interactive engagement. A unit on forces was taught with group work. Students worked with another student (or a group of students) each day of the unit either on worksheets, posed questions, or homework. The final part consisted of teaching Newton's Second Law using the peer instruction method.

Peer instruction combined short lecture intervals of five to ten minutes followed by a conceptual multiple choice question(s) posted on the board. After students silently read the question, they indicated their answers using a set of flash-cards. The signaling of answers allowed each student to form an opinion based upon their own internal reflection, and to insure that all students had the time to read the question and process the information. Once all students had initially responded, they then turned to their groups and tried to convince others why their answer was correct by explaining the reasoning behind a particular choice. After the groups had discussed their reasoning, they then used the flash-cards to indicate the correct answer. At this point, a majority (80 – 90%) had chosen the correct answer. If an incorrect answer was chosen by many, or their responses were split between two or more choices, I followed up with a second question to redirect student thinking, and initiated a new round of discussion. The new response for answers always had a majority of students with the correct answer choice. Only at this point was the correct answer revealed with an explanation of the reasoning behind it.

Data Collection

Data collection for my project, based upon the action research model, looked at the conceptual understanding of physics students using three separate instruments. One way of measuring conceptual understanding in physics, is to use the Force Concept Inventory (FCI) (Cahyadi, 2004; Hake, 1998). Hestenes, Wells, and Swackhamer (1992) created the FCI as a diagnostic tool to distinguish between common sense knowledge and the conceptual understanding of force. They worded the FCI so that a students' math background would not influence their test score. Hestenes and Halloun (1995) have repeatedly stated that the FCI measures the understanding of the Newtonian force concept, and that by receiving a score of 85% or above a student has achieved mastery of the concept. The FCI may be used not only as a means of checking student conceptual understanding, but may also allow for a teacher to make informed decisions about the material they are currently teaching, and whether that material is being understood by a majority of the students. The Force Concept Inventory (FCI) was given at the beginning of the year to designate a baseline of physics concepts for each student. Scores were calculated and compared to their scores on the FCI taken at the end of the instruction on mechanics. A student who scored above 85% on the FCI had achieved mastery of the content (Hestenes et al., 1992).

The Concept Checklist (Appendix A) looked at how individual student understanding changed for specific ideas within a particular class period. The Checklist had students enter their answer to a multiple choice question, and after discussion, enter a second answer. This was used with in conjunction with the peer instruction method.

Formative Assessments (Keeley, Eberle, & Dorsey, 2008) were used as pre- and post- instruction assessments. A formative assessment was used at the beginning of a unit and again at the end during each of the three parts of the treatment. The percentage of student answers to each formative assessment was calculated for each unit comparing answers pre- and post-instruction.

Questionnaires are typically used to measure a student's motivation, attitude, (Garcia & Pintrich, 1995; Cortright et al., 2005) and effectiveness (Cahyadi, 2004). Motivation of the students was assessed through three different questionnaires. All questionnaires were given at the end of their respective unit. Each questionnaire was a combination of Likert style answers and qualitative student responses. The Group Questionnaire (Appendix B) probed students on how working with other students in a group impacted their motivation. The Lecture Questionnaire (Appendix C) asked students how a traditional lecture style impacted motivation. The Peer Instruction Questionnaire (Appendix D) focused on how peer instruction impacted motivation. A fourth questionnaire, the Motivated Strategies for Learning Questionnaire (MSLQ), was adapted from Pintrich, Smith, Garcia, and McKeachie (1991). The MSLQ (Appendix E) assessed student motivation and their response to the implementation. Parts of the survey focused on motivation, engagement, help seeking and peer learning. Motivation reflected the student attitude that more effort put into learning results in a better grade. Engagement refers to how interesting the material is to the student. It also refers to how often students participated during class when learning the concepts. Seeking help from either other students or the instructor was the action taken by students who were trying to comprehend the material. Explaining material to other students and learning from other students is reflected in peer learning. This survey was given at the beginning of the school year to gather base-line information. The MSLQ was then given post-implementation to assess the affect of interactive engagement on motivation.

This project also looked at student engagement using The Observer Checklist (Appendix F). The Observer Checklist had an outside observer come into the classroom and check-off the number of times each student participated in class. This Observer Checklist was given during a traditional lecture, a peer instruction class, and a group interactive class, to compare the engagement of students. The MSLQ was also used to monitor how student participation was affected by the implementation.

The Data Triangulation Matrix (Table 1) summarizes the data collection instruments in response to the research questions posed for the project.

Table 1
Data Triangulation Matrix

Research Questions	*Data Source*		
	1	2	3
1. How will engagement impact motivation?	Group/Lecture/ Peer Instruction Questionnaires	MLSQ	
2. How will engagement impact conceptual understanding?	Pre/Post FCI	Concept Checklist	Pre/Post Formative Assessments
3. How has the amount (number of times) of engagement changed?	Observer Checklist	MLSQ	

DATA AND ANALYSIS

The results of the Group Formative Assessment indicated that students' answers to the number of forces acting on an apple on a desk rose from 43.4% pre-instruction to 97.6% post (N = 53 pre, N = 42 post). The student who answered incorrectly on the post assessment that one force applied instead of two forces, wrote correctly that "…because the apple is in equilibrium and not moving so therefore [sic], there has to be two forces acting upon the apple."

The Lecture Formative Assessment described the scenario where a ball is shot sideways by a spring at the same time a ball is dropped, the concept of projectile motion. The students who answered correctly increased from 14.3% to 95.6% pre to post-treatment (N = 49 pre, N = 45 post). Many students who answered incorrectly reasoned on the pre-assessment that the dropped ball will fall directly down, and the shot one will move sideways first and therefore have a slightly longer path and hit the ground second.

The Peer Instruction Formative Assessment asked students to analyze the following situation: three balls of different masses are dropped from shoulder height. The students were to determine in what order the balls will hit the ground. The correct answer (hit at same time) was explained by one student as "the ratio of the ball's mass to its weight is the same for all 3 balls." Pre to post-treatment student responses actually decreased from 60.9% to 52.8% (*N* = 46 pre, *N* = 53 post).

Figures 1 and 2 illustrate that students did not see themselves as actively learning material from their peers, neither before nor after treatment. Although college preparatory (CP) students were very motivated to do well in the class as compared with honors (H) before treatment, they showed less engagement in learning the concept than the H students. In addition, the H students were much more self-directed in seeking help when they did not understand a concept than the CP students. After treatment, H students reported increased motivation during physics, but the engagement and interest in the material declined, while help seeking remained the same (Figure 1). CP student responses for motivation, engagement, and peer learning remained the same after treatment, while students reported an increase in help seeking (Figure 2).

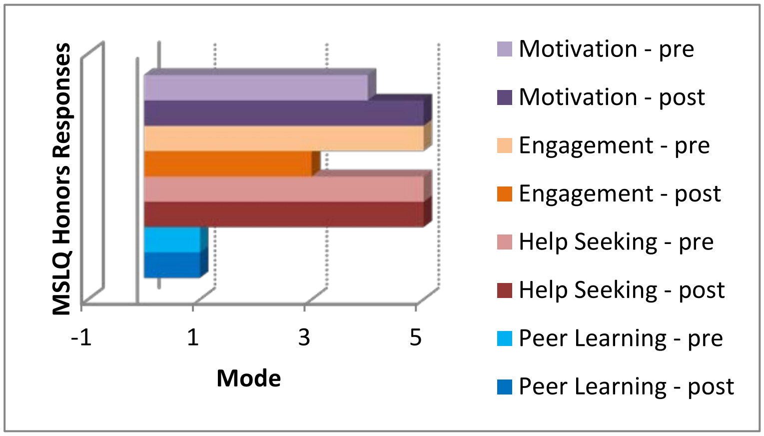

Figure 1. Responses (0 = Not at all true of me, 5 = Very true of me) given by Honors students when rating themselves with MSLQ survey given pre and post – treatment (*N* = 31 pre, *N* = 29 post).

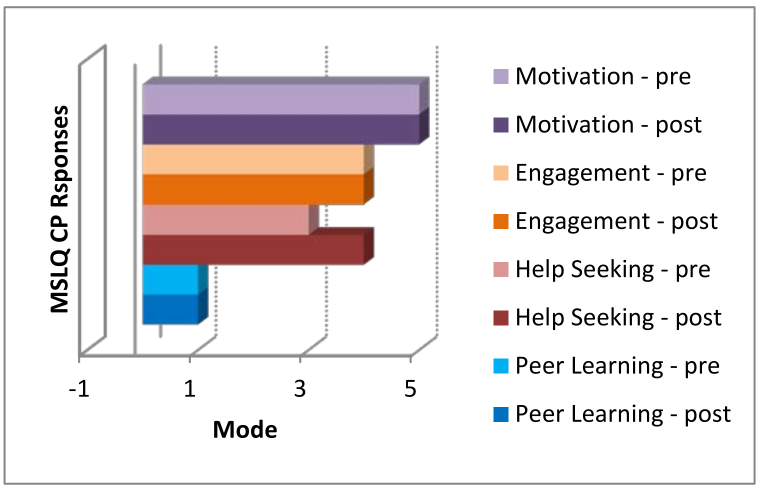

Figure 2. Responses (0 = Not at all true of me, 5 = Very true of me) given by College Preparatory students when rating themselves with MSLQ survey given pre and post – treatment (*N* = 20, *N* = 17).

Engagement does change with respect to teaching method (Figure 3). The pie graph shows that not many students participated or had interaction with the learning of the material during lectures. The data was tallied from the Observer Checklist. Students exhibited passive behavior in their learning. Among all three physics sections, less than six out of ten students either answered questions posed during lecture, or had asked questions to ask. Students participated the most during group work when they interacted with their peers. On average, every student participated and was engaged at least eight times more during group work than during lecture. The dynamics of cooperative group work did not allow students to remain passive with the material. Peer instruction fell in between these two. Every student participated about five times more than during lecture. Each student was required to individually answer the posed question with the flash-card. During the group discussion, students had a choice whether to participate actively with their peers or to listen silently.

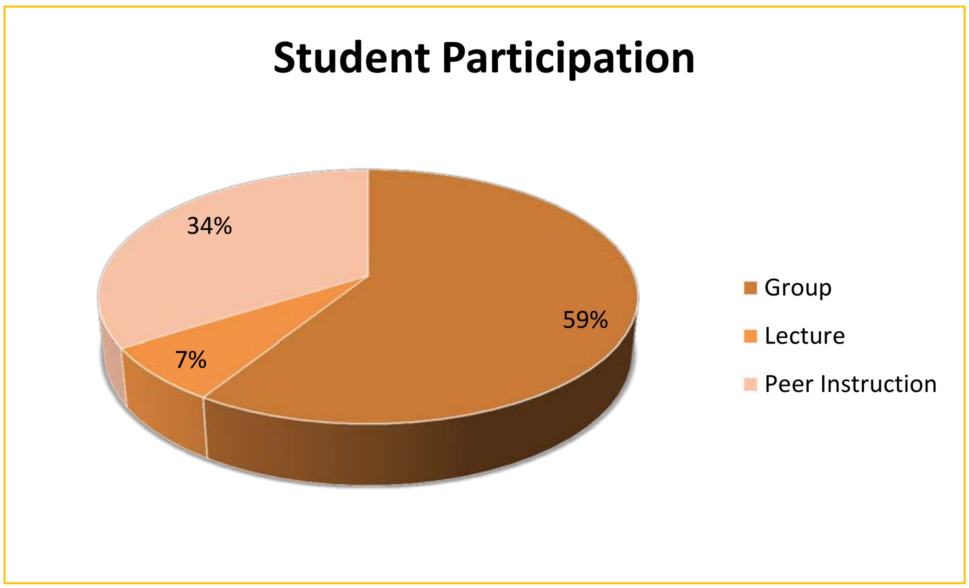

Figure 3. Student engagement in class during various teaching methods expressed as number of times participated during class (Group N = 50, Lecture N = 51, Peer Instruction N = 48).

INTERPRETATION AND CONCLUSION

Regardless of the level of the concept at the start of instruction of the forces unit, the Group Formative Assessment showed that all the students understood the concept as it was taught through group work.

The Lecture Formative Assessment showed that students understood that vertical and horizontal movements of a projectile are independent of each other and that both balls would hit the ground at the same time. Many students on the pre-assessment incorrectly indicated a relationship between distance traveled and the time the ball is in the air. The two students who answered the post-assessment incorrectly continued with the idea that somehow the trajectory influenced the amount of time the shot ball was in the air.

The students who incorrectly reasoned on the Peer Instruction Post - Assessment that the answer is dependent upon mass were continuing to misapply how air resistance functions on a falling object. This may be due to the lasting influence of their peers during this treatment.

The Motivated Strategies for Learning Questionnaire (MSLQ) indicates that students did not feel that they learned more or better from their peers. It was heartening to see that CP students after treatment were more inclined to seek help when they did not understand a concept. Also, H student motivation increased. Overall, all students were motivated to do well, and engaged in the learning of material.

Based upon my findings, students are receptive to learning ideas from interactive engagement. I had expected that after all three parts of the treatment were finished that students would have learned the underlying concept regardless of the treatment being used, but this was not the case for peer instruction. Many students enjoyed using the flashcards as stated by one student from the Peer Instruction Questionnaire "…that the flashcards were fun and it felt like a game." I was disturbed that almost 39.4% of students were not reaching understanding of Newton's Second Law. While observing the students during this interval of time, I noticed that sometimes after interacting with their groups, that students would continue to choose an incorrect answer and persisted in that answer because the group had come to an agreement upon the answer and were convinced of it. I usually had to spend much more time trying to "undo" the misguided explanation they were working with than I had thought I would need for the lesson. I feel that using this method with the flashcards is valid because many students needed the wait time to understand the question on their own. I do not feel that working with groups at this stage is beneficial because students are being swayed by faulty reasoning into choosing an incorrect answer because of that peer interaction.

Most students participated during the Group treatment verses Lecture and Peer Interaction. I felt that having students work together on worksheets and a project benefitted them the most because they had to reason out their own thoughts first before I would help them. Many students responded that they looked forward to this part of the lesson because they "knew they would have help" from other students if they needed to ask questions. I would definitely integrate this into all my lessons for physics since the students were motivated about being able to ask others for help.

VALUE

The value of this study was that I could determine what was most effective for my students in terms of teaching style through actual data. This is my fifth year teaching physics. I had started out teaching with giving mostly lecture and over the years have tried to integrate more types of interactive engagement, but I never really knew how to gauge whether students were more or less motivated with the material.

This process, although extremely involved, allowed me to truly gain specific insight from the student perspective. Students always seemed “bored” by lecture. I usually knew after the test how all students fared with learning the concepts but never during the unit. During the course of my time with this project I had learned about formative assessments. I was struggling with getting feedback from students and this seemed fortuitous in providing me with exactly what I wanted. Since I teach at a performing arts school, a majority of my students like to “do” things verses being told about them. The multiple opportunities provided by interactive engagement allow those students to relate to the material in a way that they would not have before.

I felt that I have changed in the way I view how students are interacting with the material. Before, I felt that students just needed “to get the material” and just had to work harder. At this point, I recognize that students learn differently and are encouraged to do so when they have opportunities that work for them. This allows them to be self motivated which in turn, they then continue to bring into other areas. I was surprised to see this actually. This process required a huge time commitment on my part, and forbearance from the students since they were asked to fill out questionnaires and information for me and “my project.” Although my students this year finished a chapter behind where they usually are, I felt that they benefitted from the learning and I benefitted because I can modify how I present the material based upon the findings.

I have grown from this experience and am grateful to have learned many things along the way that the MSSE program has provided for me. I feel that I have become a better teacher because not only do I now have a solid way of gauging whether the teaching methods I am using are benefitting the students but I have experienced a variety of teaching tools to use with my students which will benefit them. In the long run, this benefits me and allows me to help them more effectively.

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APPENDICES

APPENDIX A

CONCEPT CHECKLIST

Appendix A
Concept Checklist

Name: Physics
Day: Pd: Mrs. Ritter

<u>Directions</u>: Indicate your answer for each question by placing a checkmark on the line. Then after the group discussion, indicate your answer again in the appropriate space, even if your answer is different. Remember, that this is not graded, and that the purpose is to track how your answers *might* change.

Cart on Track I

___1 ___2 ___3 ___4 ___5

Your answer after discussion:

___1 ___2 ___3 ___4 ___5

Did your answer change? __yes / __ no

What prompted you to change (or keep) your answer? ______________________________

____

____

____

____

Cart on Track II

___1 ___2 ___3 ___4 ___5

Your answer after discussion:

___1 ___2 ___3 ___4 ___5

Did your answer change? __yes / __ no

What prompted you to change (or keep) your answer? ______________________________

____

____

____

____

APPENDIX B

GROUP QUESTIONNAIRE

Appendix B
Group Questionnaire

1. Please rate your level of comfort with group work:
   Very comfortable / Somewhat comfortable / Somewhat uncomfortable / Very uncomfortable

   Please explain why you chose the answer you did.

2. How has the group work affected your understanding of the concept?

3. How has the group work affected your motivation during class?

4. Rate the following in terms of how they helped you learn the concept of forces.

   Lectures: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

   Math problems: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

   Group work: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

5. Rate the following in how active you were in learning the subject matter.

   Math problems: *Very rarely / Rarely / Sometimes / Often / Very often*
   Why did you choose your answer?

   Lecture: *Very rarely / Rarely / Sometimes / Often / Very often*
   Why did you choose your answer?

   Group work: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

6. How do you feel about learning from the group?

7. Do you feel that you participate more or less in class with group work? Why do think that?

8. Is there anything else you would like me to know?

APPENDIX C

LECTURE QUESTIONNAIRE

Appendix C
Lecture Questionnaire

1. Please rate your level of comfort with the straight lecture format:

   Very comfortable / Somewhat comfortable / Neither / Somewhat uncomfortable / Very uncomfortable

   Please explain why you chose the answer you did.

2. How have the lectures affected your understanding of the concept?

3. How have the lectures affected your motivation during class?

4. Rate the following in terms of how they helped you learn the concept of linear and projectile motion.

   Lectures: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

   Math problems: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

5. Rate the following in how active you were in learning the subject matter.

   Math problems: *Very rarely / Rarely / Sometimes / Often / Very often*
   Why did you choose your answer?

   Lecture: *Very rarely / Rarely / Sometimes / Often / Very often*
   Why did you choose your answer?

6. How do you feel about learning only with lecture?

7. Do you feel that you participate less in class with lectures? Why do think that?

8. Is there anything else you would like me to know?

APPENDIX D

PEER INSTRUCTION QUESTIONNAIRE

Appendix D
Peer Instruction Questionnaire

1. Please rate your level of comfort with the flash-cards:

   Very comfortable / Somewhat comfortable / Neither / Somewhat uncomfortable / Very uncomfortable

   Please explain why you chose the answer you did.

2. How have the question checks (peer instruction) with the flash-cards affected your understanding of the concept?

3. How have the question checks and the group discussion (peer instruction) affected your motivation during class?

4. Rate the following in terms of how they helped you learn the concept of Newton's Second Law.

   Question checks and group discussions:
   Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful
   Explain why you choose your answer.

   Math problems: *Not helpful / Rarely helpful / No difference / Somewhat helpful / Very helpful*
   Explain why you choose your answer.

5. Rate the following in how active you were in learning the subject matter.

   Peer instruction (group discussion with question checks):
   Very rarely / Rarely / Sometimes / Often / Very often
   Why did you choose your answer?

   Lecture: *Very rarely / Rarely / Sometimes / Often / Very often*
   Why did you choose your answer?

6. How do you feel about this type of learning verses learning only with lecture?

7. Do you feel that you participate more in class with the use of the flash-cards or by answering questions I ask directed at the entire class? Why do think that?

8. Is there anything else you would like me to know?

APPENDIX E

MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE

Appendix E
MSLQ

Name:	Physics
Day: Pd:	Mrs. Ritter

Adapted Motivated Strategies for Learning Questionnaire from Pintrich, P.R., Smith, D.A.F., Garcia, T., & McKeachie, W.J. (1991). Manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). From the national Center for Research to Improve Postsecondary teaching and Learning Project on Instructional Processes and Education Outcomes. Ann Arbor, MI: The Regents of The University of Michigan.

Part A. Motivation

This survey is voluntary. The following questions ask about your motivation for and attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 5; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

1	2	3	4	5
Not at all true of me				Very true of me

1. In a class like this, I prefer course material that really challenges me so I can learn new things.	1	2	3	4	5
2. If I study in appropriate ways, then I will be able to learn the material in this course.	1	2	3	4	5
3. When I take a test I think about how poorly I am doing compared with other students.	1	2	3	4	5
4. I think I will be able to use what I learn in this course in other courses.	1	2	3	4	5
5. I believe I will receive an excellent grade in this class.	1	2	3	4	5
6. I'm certain I can understand the most difficult material presented in the readings for this course.	1	2	3	4	5

7. Getting a good grade in this class is the most satisfying thing for me right now.	1	2	3	4	5
8. When I take a test I think about items on other parts of the test I can’t answer.	1	2	3	4	5
9. It is my own fault if I don’t learn the material in this course.	1	2	3	4	5
10. It is important for me to learn the course material in this class.	1	2	3	4	5
11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	1	2	3	4	5
12. I’m confident I can learn the basic concepts taught in this course.	1	2	3	4	5
13. If I can, I want to get better grades in this class than most of the other students.	1	2	3	4	5
14. When I take tests I think of the consequences of failing.	1	2	3	4	5
15. I’m confident I can understand the most complex material presented by the instructor in this course.	1	2	3	4	5
16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	1	2	3	4	5
17. I am very interested in the content area of this course.	1	2	3	4	5
18. If I try hard enough, then I will understand the course material.	1	2	3	4	5
19. I have an uneasy, upset feeling when I take an exam.	1	2	3	4	5
20. I’m confident I can do an excellent job on the assignments and tests in this course.	1	2	3	4	5
21. I expect to do well in this class.	1	2	3	4	5
22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	1	2	3	4	5

23. I think the course material in this class is useful to me to learn.	1	2	3	4	5
24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don’t guarantee a good grade.	1	2	3	4	5
25. If I don’t understand the course material, it is because I didn’t try hard enough.	1	2	3	4	5
26. I like the subject matter of this course.	1	2	3	4	5
27. Understanding the subject matter of this course is very important to me.	1	2	3	4	5
28. I feel my heart beating fast when I take an exam.	1	2	3	4	5
29. I’m certain I can master the skills being taught in this class.	1	2	3	4	5
30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	1	2	3	4	5
31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	1	2	3	4	5

Part B. Learning Strategies

The following questions ask about your learning strategies and study skills for this class. Again, there are no right or wrong answers. Answer the questions about how you study in this class as accurately as possible. Use the same scale to answer the remaining questions. If you think the statement is very true of you, circle 5; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

1	2	3	4	5
Not at all true of me				Very true of me

32. When I study the readings for this course, I outline the material to help me organize my thoughts.	1	2	3	4	5

33. During class time I often miss important points because I'm thinking of other things.	1	2	3	4	5
34. When studying for this course, I often try to explain the material to a classmate or friend.	1	2	3	4	5
35. I usually study in a place where I can concentrate on my course work.	1	2	3	4	5
36. When reading for this course, I make up questions to help focus my reading.	1	2	3	4	5
37. I often feel so lazy or bored when I study for this class that I quit before I finish when I planned to do.	1	2	3	4	5
38. I often find myself questioning things I hear or read in this course to decide if I find them convincing.	1	2	3	4	5
39. When I study for this class, I practice saying the material to myself over and over.	1	2	3	4	5
40. Even if I have trouble learning the material in this class, I to do the work on my own, without help from anyone.	1	2	3	4	5
41. When I become confused about something I'm reading for this class, I go back and try to figure it out.	1	2	3	4	5
42. When I study for this course I go through the readings and my class notes and try to find the most important ideas.	1	2	3	4	5
43. I make good use of my study time for this course.	1	2	3	4	5
44. If course readings are difficult to understand, I change the way I read the material.	1	2	3	4	5
45. I try to work with other students from this class to complete the course assignments.	1	2	3	4	5
46. When studying for this course, I read my class notes and the course readings over and over again.	1	2	3	4	5
47. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.	1	2	3	4	5

48. I work hard to do well in this class even if I don't like what we are doing.	1	2	3	4	5
49. I make simple charts, diagrams, or tables to help me organize course material.	1	2	3	4	5
50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.	1	2	3	4	5
51. I treat the course material as a starting point and try to develop my own ideas about it.	1	2	3	4	5
52. I find it hard to stick to a study schedule.	1	2	3	4	5
53. When I study for this class, I pull together information from different sources, such as lectures, reading, and discussions.	1	2	3	4	5
54. Before I study new course material thoroughly, I often skim it to see how it is organized.	1	2	3	4	5
55. I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5
56. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.	1	2	3	4	5
57. I often find that I have been reading for this class but don't know what it was all about.	1	2	3	4	5
58. I ask the instructor to clarify concepts I don't understand well.	1	2	3	4	5
59. I memorize key words to remind me of important concepts in this class.	1	2	3	4	5
60. When course work is difficult, I either give up or only study the east parts.	1	2	3	4	5
61. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.	1	2	3	4	5
62. I try to relate ideas in this subject to those in other courses whenever possible.	1	2	3	4	5

63. When I study for this course, I go over my class notes and make an outline of important concepts.	1	2	3	4	5
64. When reading for this class, I try to relate the material to what I already know.	1	2	3	4	5
65. I have a regular place set aside for studying.	1	2	3	4	5
66. I try to play around with ideas of my own related to what I am learning in this course.	1	2	3	4	5
67. When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.	1	2	3	4	5
68. When I can't understand the material in this course, I ask another student in this class for help.	1	2	3	4	5
69. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.	1	2	3	4	5
70. I make sure that I keep up with the weekly readings and assignments for this course.	1	2	3	4	5
71. Whenever I read or hear as assertion or conclusion in this class, I think about possible alternatives.	1	2	3	4	5
72. I make lists of important items for this course and memorize the lists.	1	2	3	4	5
73. I attend this class regularly.	1	2	3	4	5
74. Even when course materials are dull and uninteresting, I manage to keep working until I finish.	1	2	3	4	5
75. I try to identify students in this class whom I can ask for help if necessary.	1	2	3	4	5
76. When studying for this course I try to determine which concepts I don't understand well.	1	2	3	4	5
77. I often find that I don't spend very much time on this course because of other activities.	1	2	3	4	5

78. When I study for this class, I set goals for myself in order to direct my activities in each study period.	1	2	3	4	5
79. If I get confused taking notes in class, I make sure I sort it out afterwards.	1	2	3	4	5
80. I rarely find time to review my notes or readings before an exam.	1	2	3	4	5
81. I try to apply ideas from course readings in other class activities such as lecture and discussion.	1	2	3	4	5

APPENDIX F

OBSERVER CHECKLIST

Appendix F
Observer Checklist